Now, claims 10-12 each defines a screw-in gas discharge lamp assembly wherein the lamp itself is clearly segregated from the remainder of the assembly -- that is, without requiring part of the ballasting means to be interposed between the "legs" of the gas discgarge lamp. This arrangement is clearly neither anticipated nor suggested by Skeist.

Examiner rejected claims 10-12 and 19-21 under 35 USC 103 as being unpatentable over Dale et al. ("Dale") in view of Wotowiec and further in view of either Skeist or Moerkens et al. ("Moerkens").

Amended claims 10-12 and 19-21 provide sufficient differentiation over Dale, Wotowiec and Skeist or Moerkens to obviate these "103" rejections.

For instance, claim 20 now defines a combination which includes an inverter means providing a high-frequency output current having a fundamental period and including a transistor so arranged as:

"to conduct current for no longer than a brief span of time once during each fundamental period; the duration of said brief span of time being shorter than half the duration of said fundamental period".

This feature is neither described nor suggested by any of the cited references.

New claim 24 defines a screw-in gas discharge lamp having a built-in electronic ballast wherein a transistor is being operated by control signal with a waveform such as that of Fig. 3B; which feature is neither described nor suggested by any of the cited references.

Ole K. Nilssen, Pro Se Applicant

RE-AMENDED CLAIMS in Serial No. 07/357,797

B1

10. (Amended) An arrangement comprising:

base means adapted to screw into and to be supported by an ordinary Edison-type lamp socket; the lamp socket having socket electrodes whereat an AC voltage is provided; the base means having base electrodes making electrical contact with the socket electrodes whenever in fact the base means is screwed into said lamp socket;

rectifier means electrically connected with the base electrodes and operable to provide a DC voltage at a set of DC output terminals; there being an electrical conduction path between the base electrodes and the DC terminals;

gas discharge lamp means having a set of lamp terminals; the gas discharge lamp means having a substantially tubular glass envelope as well as a pair of thermionic cathodes; each thermionic cathode being connected with one of the lamp terminals; each thermionic cathode being located substantially in a plane perpendicular to at least one part of the tubular glass envelope; substantially all of the glass envelope being located on one side of this plane; the lamp terminals being located on the other side of this plane; and

inverter-type ballast means having a DC input and a high-frequency output; the DC input being connected in circuit between the DC output terminals and the lamp terminals;

the arrangement being so constructed as: (i) to constitute an integral self-ballasted gas discharge lamp unit operable to be screwed into and supported by said ordinary Edison-type lamp socket, thereby to be properly powered by a power line voltage provided thereat; and (ii) to have the base means, the rectifier means and the inverter-type ballast means located substantially in their entirety on said other side of the plane, such that no part of the inverter-type ballast means protrudes into the space on said one side of the plane.

11. The arrangement of claim 10 wherein the gas discharge lamp means is a folded fluorescent lamp; the folded fluorescent lamp having a shape similar to that of a letter U.

12. (Amended) An arrangement comprising:

base means adapted to screw into and to be supported by an ordinary Edison-type lamp socket; the lamp socket having socket electrodes whereat an AC voltage is provided; the base means having base electrodes making electrical contact with the socket electrodes whenever in fact the base means is screwed into said lamp socket;

frequency-converting ballast means electrically connected with the base electrodes and operable to provide an alternating current at a set of output terminals; and

gas discharge lamp means having a set of lamp terminals connected with the output terminals; the gas discharge lamp means being characterized by having two substantially parallel columns of gas; which two columns of gas are connected with one another by way of a substantially transverse-oriented column of gas;

the arrangement being so constructed as: (i) to constitute an integral self-ballasted gas discharge lamp unit operable to be screwed into, supported by, as well as properly powered from said ordinary Edison-type lamp socket; and (ii) to permit a spherical surface to enclose the gas discharge lamp means whithout at the same time also enclosing any substantive part of the remainder of the arrangement.

---

19. (Amended) A gas discharge lamp assembly [means] operable to be inserted into and held by an ordinary Edison-type lamp socket; the lamp socket having socket electrodes; the gas discharge lamp assembly [means] comprising:

base means operable to be inserted into the Edison-type lamp socket; the base means having base electrodes operable to make electric contact with the socket electrodes; the base means also having a set of AC terminals from which is provided an alternating current of frequency substantially higher than the frequency of the AC power line voltage on an ordinary electric utility power line; and

gas discharge lamp having lamp terminals connected with the AC terminals, thereby to be properly powered by the alternating current provided therefrom; the gas discharge lamp being mounted on the base means and characterized by having two substantially parallel columns of gas[, each column having a first cross-sectional area]; the two columns of gas being connected with one another by way of a substantially transverse-oriented column of gas; [the transverse-oriented column of gas having a second cross-sectional area; the second cross-sectional area being smaller than the first cross-sectional area.]

the gas discharge lamp assembly being so constructed as to permit a spherical surface to enclose the gas discharge lamp without at the same time also enclosing any substantive part of the remainder of the gas discharge lamp assembly.

20. (Amended) A lamp assembly [means] operable to be inserted into and held by an ordinary Edison-type lamp socket; the lamp socket having socket electrodes; the lamp assembly [means] comprising:

a gas discharge lamp having lamp terminals; the gas discharge lamp including two mutually parallel cylindrical segments of glass tubing enclosing an ionizable gas;

base means operable to be inserted into the Edison-type lamp socket; the base means having base electrodes operable to make electric contact with the socket electrodes; the base means also including a combination of:

(a) a rectifier means connected with the socket electrodes and operative to provide a DC voltage at a set of DC output terminals;

(b) an inverter means connected with the DC output terminals and operative to provide a high-frequency output current from a set of high-frequency output terminals; the high-frequency output current having a fundamental period; the inverter means including a transistor operative periodically to conduct current in response to a control voltage provided at a control input; and

(c) an L-C means connected in circuit between the high-frequency output terminals and the lamp terminals; the L-C means being operative by way of resonant action to cause a substantially sinusoidal high-frequency voltage to be present across the tank-capacitor; the fundamental frequency of this high-frequency voltage being the same as that of the high-frequency current;

the combination being so arranged as to cause the transistor to conduct current for no longer than a brief span of time once during each fundamental period; the duration of said brief span of time being shorter than half the duration of said fundamental period.

21. (Amended) A lamp assembly [means] operable to be inserted into and held by an ordinary Edison-type lamp socket; the lamp socket having socket electrodes; the lamp assembly [means] comprising:

a gas discharge lamp having lamp terminals;

base means operable to be inserted into the Edison-type lamp socket; the base means having base electrodes operable to make electric contact with the socket electrodes; the base means also including a combination of:

(a) a rectifier means connected with the socket electrodes and operative to provide a DC voltage at a set of DC output terminals;

(b) an inverter means connected with the DC output terminals and operative to provide a high-frequency output voltage from a set of inverter output terminals; [the high-frequency output voltage having a substantially trapezoidal waveform with a fundamental period; the trapezoidal waveform consisting of: (i) first periods during which its magnitude is either uniformly rising or uniformly falling; and (ii) second periods during which its magnitude remains substantially constant; the duration of all the second periods being shorter that the duration of the complete fundamental period;] and

(c) current-limiting means connected in circuit between the inverter output terminals and the lamp terminals;

the lamp assembly being so constituted as to permit a spherical surface to enclose the gas discharge lamp without at the same time also enclosing the base means.

---

24. A lamp assembly adapted to be inserted into and held by an ordinary Edison-type lamp socket; the lamp socket having socket electrodes; the lamp assembly comprising:

a gas discharge lamp having lamp terminals;

base means operable to be inserted into the Edison-type lamp socket; the base means having base electrodes operable to make electric contact with the socket electrodes; the base means also including frequency-converting ballast means connected in circuit between the base electrodes and the lamp terminals; the ballast means being operative to provide an AC voltage to the lamp terminals; the AC voltage having a fundamental period; the ballast means including a transistor having a control input receiving a control signal; the transistor being operative to conduct whenever the instantaneous magnitude of the control signal exceeds a certain level; the instantaneous magnitude of the control signal exceeding said certain level for only a brief period during each fundamental period; the duration of the brief period being shorter than half the duration of the fundamental period.
